

CLAIMS

WE CLAIM AS OUR INVENTION:

1 – 16 (canceled)

17. (new) A process for producing a ceramic shaped object from ceramic powder, comprising:

forming a first region of the shaped object by a first laser sintering of a first ceramic powder; and

forming a second region of the shaped object integral with the first region by a second laser sintering of a second ceramic powder,

wherein the forming of at least one of the first and second regions comprises controlling at least one parameter selected to provide a different material property in the first and second regions of the shaped object.

18. (new) The process of claim 17, wherein a ceramic mold is formed.

19. (new) The process of claim 17, wherein the material property is selected from the group consisting of: densification, porosity, surface roughness, and any combination thereof.

20. (new) The process of claim 17, further comprising controlling a laser beam generated during the first and second laser sintering processes to produce a different sintering temperature over the first and second regions of the object creating a different degree of densification in the first and second regions of the shaped object.

21. (new) The process of claim 18, further comprising at least one of an additional laser sintering process and a hot isostatic pressing of the ceramic mold to achieve any further densification.

22. (new) The process of claim 17, further comprising accessing a computerized representation of the object and using the computerized representation to control the process for producing the ceramic shaped object.

23. (new) The process of claim 18, further controlling the process to form the first region of the ceramic mold to comprise a shell and the second region of the ceramic mold to comprise a core disposed in a cavity of the shell.

24. (new) The process of claim 18, wherein the first region of the ceramic mold comprises an inner region and the second region of the ceramic mold comprises an outer region and the process is controlled so that the inner region is denser than the outer region of the mold.

25. (new) The process of claim 17, further comprising using a ceramic powder or a powder mixture comprising grain sizes of less than 30 μm for at least one of the regions of the object.

26. (new) The process of claim 17, further comprising using a ceramic powder and a powder mixture comprising grain sizes of less than 30 μm for at least one of the regions of the object.

27. (new) The process of claim 17, wherein the ceramic powder comprises at least one ingredient that affects densification and/or sintering of the ceramic powder by producing a liquid phase for at least one of the regions of the object.

28. (new) The process of claim 18, wherein the process is controlled to provide a surface in an inner region of the ceramic mold comprising a surface roughness different from an outer region of the ceramic mold.

29. (new) A mold for producing a ceramic shaped object, comprising:
a first region of the ceramic shaped object formed by a first sintering of a first ceramic powder;
a second region of the ceramic shaped object formed by a second sintering of a second ceramic powder and the second region is integral with the first region; and
a parameter selected and controlled to provide a different material property in the first and second regions of the shaped object.

30. (new) The mold as claimed in claim 29, wherein the mold is a ceramic mold.

31. (new) The mold as claimed in claim 29, wherein the first ceramic powder comprises a first material and the second ceramic powder comprises a second material different than the first material.

32. (new) The mold as claimed in claim 29, wherein the first region comprises a first porosity and the second region comprises a second porosity different than the first porosity.

33. (new) The mold as claimed in claim 29, wherein the first region comprises a first density and the second region comprises a second density different than the first density.

34. (new) The mold as claimed in claim 29, wherein the first region comprises a first surface roughness and the second region comprises a second surface roughness different than the first surface roughness.

35. (new) The mold as claimed in claim 29, wherein the first ceramic powder comprises a first average grain size and the second ceramic powder comprises a second average grain size.